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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,538	01/27/2004	Kazunari Oyama	02910.000110.	9614

5514 7590 10/06/2004

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EXAMINER

ANYASO, UCHENDU O

ART UNIT	PAPER NUMBER
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2675

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/764,538

**Applicant(s)**

OYAMA ET AL.

**Examiner**

Uchendu O Anyaso

**Art Unit**

2675

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. **Claims 1-9** are pending in this action.

***Claim Rejections - 35 USC ' 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 3, 5, 7 and 9** are rejected under 35 U.S.C. 102(b) as being anticipated by *Iwasaki et al* (U.S. Patent 6,066,922).

Regarding **independent claim 1**, Iwasaki teaches a driving method for an electron-emitting device (column 1, lines 5-9) in which an electron-emitting member including a plurality of carbon fibers (column 5, lines 47-56) is made to emit electrons ("e") by a voltage (Vd, Vc) being applied between a cathode electrode 15 on which the electron-emitting member is formed and a counter electrode (2) disposed in opposition to the cathode electrode 15, comprising the step of: applying a driving voltage Vd smaller than a maximum applied voltage Vc between the cathode electrode and the counter electrode to drive the electron-emitting device, the maximum applied voltage Vc being a maximum voltage applied between the cathode electrode and the counter electrode before the start of driving (column 4, lines 41-59, figure 1 at 2, 15, Vd, Vc, "e").

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Regarding **independent claims 3, 5 and 7**, Iwasaki teaches a driving method for an electron-emitting device (column 1, lines 5-9) in which an electron-emitting member including a plurality of carbon fibers (column 5, lines 47-56) is made to emit electrons ("e") by a voltage ( $V_d$ ,  $V_c$ ) being applied between a cathode electrode 15 on which the electron-emitting member is formed and a counter electrode (2) disposed in opposition to the cathode electrode (figure 1 at 2, 15).

Furthermore, Iwasaki teaches how to cause an I-V characteristic of the first electron-emitting device and an I-V characteristic of a second electron-emitting device to become closer to each other, the first electron-emitting device being operative to emit a relatively larger number of electrons among the plurality of electron-emitting devices when a predetermined voltage is applied, the second electron-emitting device being operative to emit a relatively smaller number of electrons among the plurality of electron-emitting devices when the predetermined voltage is applied (*see column 8, lines 13-29, figure 5 which shows the the I-V characteristic curve of this concept*).

Furthermore, Iwasaki teaches how to apply a driving voltage  $V_d$  smaller than a maximum applied voltage  $V_c$  between the cathode electrode and the counter electrode to drive the electron-emitting device, the maximum applied voltage  $V_c$  being a maximum voltage applied between the cathode electrode and the counter electrode before the start of driving (column 4, lines 41-59, figure 1 at 2, 15,  $V_d$ ,  $V_c$ ).

Regarding **independent claim 9**, Iwasaki teaches a driving method for an electron-emitting device (column 1, lines 5-9) in which an electron-emitting member including a

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plurality of carbon fibers (column 5, lines 47-56) is made to emit electrons ("e") by a voltage ( $V_d$ ,  $V_c$ ) being applied between a cathode electrode 15 on which the electron-emitting member is formed and a counter electrode (2) disposed in opposition to the cathode electrode (figure 1 at 2, 15).

Furthermore, Iwasaki teaches a luminescent material by teaching transparent collector electrodes and fluorescent substances corresponding to RGB color emissions that provided in the internal surface of substrate 1 wherein an electron-emitting member including a plurality of carbon fibers (column 5, lines 47-56) is made to emit electrons ("e") (column 4, lines 32-35, figure 1 at 1, 2, 15).

Furthermore, Iwasaki teaches control circuitry via voltage sources ( $V_c$ ,  $V_d$ ) to cause an I-V characteristic of the first electron-emitting device and an I-V characteristic of a second electron-emitting device to become closer to each other, the first electron-emitting device being operative to emit a relatively larger number of electrons among the plurality of electron-emitting devices when a predetermined voltage is applied, the second electron-emitting device being operative to emit a relatively smaller number of electrons among the plurality of electron-emitting devices when the predetermined voltage is applied (*see* column 8, lines 13-29, figure 5 *which shows the the I-V characteristic curve of this concept*).

Furthermore, Iwasaki teaches how to apply a driving voltage  $V_d$  smaller than a maximum applied voltage  $V_c$  between the cathode electrode and the counter electrode to drive the electron-emitting device, the maximum applied voltage  $V_c$  being a maximum voltage applied between the cathode electrode and the counter electrode before the start of driving (column 4, lines 41-59, figure 1 at 2, 15,  $V_d$ ,  $V_c$ ).

***Claim Rejections - 35 USC ' 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 2, 4, 6 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Iwasaki et al* (U.S. Patent 6,066,922) in view of *Choi* (U.S. 6,794,666).

Regarding claims 2, 4, 6 and 8, in further discussion of claims 1, 3, 5 and 7, Iwasaki teaches a driving method for an electron-emitting device (column 1, lines 5-9) in which an electron-emitting member including a plurality of carbon fibers (column 5, lines 47-56). However, Iwasaki does not teach how the carbon fibers are selected from among a plurality of carbon nanotubes.

On the other hand, Choi teaches an invention that relates to an electron emission apparatus in which carbon nanotubes are used in order to perform nano-patterning (column 1, lines 10-17; column 3, lines 8-23, figure 1 at 11).

Thus, it would have been obvious to a person of ordinary skill in the art to combine Iwasaki and Choi because while Iwasaki teaches a driving method for an electron-emitting device (column 1, lines 5-9) in which an electron-emitting member including a plurality of carbon fibers (column 5, lines 47-56), Choi teaches an invention that relates to an electron emission apparatus in which carbon nanotubes are used (column 1, lines 10-17; column 3, lines 8-23, figure 1 at 11). The motivation for combining these inventions would have been to provide a means to perform nano-patterning (column 1, lines 12-17).

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***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5,430,300 to *Yue et al* for oxidized porous silicon field emission devices.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Uchendu O. Anyaso whose telephone number is (703) 306-5934. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Saras, can be reached at (703) 305-9720.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.



Uchendu O. Anyaso

09/28/2004



CHANH NGUYEN  
PRIMARY EXAMINER